

U.S. Department of Energy  
Technical Qualification Program

# *Emergency Management Topical Area*

## **Study Guide**

**For the**

*Fire Protection  
Qualification Standard*

**May 1996**



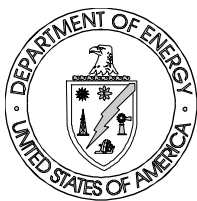
**Competency 4.7** Fire protection personnel shall demonstrate the ability to assess emergency response operations including personnel training and qualification, equipment, and facilities.

**1. Supporting Knowledge and Skills**

- a. Evaluate an emergency plan and explain the importance of pre-planning activities and emergency plan implementation exercises and drills.
- b. Evaluate the emergency response operations equipment in accordance with procedure/code requirements.
- c. Assess response times for emergency personnel and equipment with respect to emergency response operations.
- d. Observe and evaluate emergency response equipment and facility maintenance.
- e. Observe and evaluate emergency response personnel training and drills.
- f. Observe and evaluate the emergency response operations associated with the following:
  - Fire emergency
  - Medical emergency
  - Hazardous material emergency
  - Standby for hazardous operation
  - Hazardous duty/activity standby.
- g. Evaluate the number and distribution of fire stations in accordance with the applicable standard/code.

**2. Self-Study Activities (corresponding to the intent of the above competency)**

NOTES: • The DOE Orders are in a state of transition. Please refer to the following gopher site for a cross reference of new and old Orders:  
gopher://VM1.HQADMIN.DOE.GOV:70/00/doemenu1/directiv/251cross.asc



## Section 5.0

- Below are two web sites containing many of the references you may need.

Web Sites		
Organization	Site Location	Notes
Department of Energy	<a href="http://cted.inel.gov/cted/index.html">http://cted.inel.gov/cted/index.html</a>	DOE Standards, Guides, and Orders.
U.S. House of Representatives	<a href="http://law.house.gov/cfr.htm">http://law.house.gov/cfr.htm</a>	Searchable Code of Federal Regulations

**Read** DOE Order 5500.3A, *Planning and Preparedness for Operational Emergencies*.

EXERCISE 4.7-A List two activities associated with each of the following:

- Planning
- Preparedness
- Response
- Recovery

EXERCISE 4.7-B Describe how planning and preparedness activities can help to ensure a successful emergency response.

EXERCISE 4.7-C Using DOE Order 5500.3A, name the 13 elements required for an emergency management program in DOE.

**Read** 29 *Code of Federal Regulations* (CFR) 1910, “Occupational Safety and Health Standards for General Industry,” Section 1910.38, Employee Emergency Plans and Fire Prevention Plans, page 35.

EXERCISE 4.7-D Referring to 29 CFR 1910.38, what are the basic elements of a fire prevention plan?

**Read** 29 CFR 1910, “Occupational Safety and Health Standards for General Industry,” Sections 1910.164, Fire Detection Systems, and 1910.165, Employee Alarm Systems, and Appendix A of Subpart L, Fire Protection.

EXERCISE 4.7-E Using 29 CFR 1910.164, what is the maximum response delay time permitted in fire detection equipment?



**EXERCISE 4.7-F** Using 29 CFR 1910.165, how often must nonsupervised employee alarm systems and supervised employee alarm systems be tested?

**Read** 29 CFR Part 1910, *Occupational Safety and Health Standards for General Industry*, Sections 1910.156, Fire Brigades, pages 234 and 235, and the corresponding paragraphs in Appendix A, pages 240 through 244, of Subpart L, Fire Protection.

**Scan** National Fire Protection Association (NFPA) 13E, “Fire Department Operations in Properties Protected by Sprinkler, Standpipe Systems;” NFPA 1201, “Organization for Fire Services;” and NFPA 1202, “Organization of a Fire Department.”

**EXERCISE 4.7-G** Compare your facilities’ capabilities to the requirements for fire brigades and stations in 29 CFR 1910 and NFPA 13E, 1201, and 1202.

**EXERCISE 4.7-H** According to 29 CFR 1910.156, how often are you required to inspect fire-fighting equipment, and how often to inspect portable fire extinguishers and respirators?

**EXERCISE 4.7-I** According to 29 CFR 1910.156, how often is training provided to the fire brigade?

**Read** the DOE policy and concept of emergency operations, pages 2 through 7, responsibilities of the heads of field elements, pages 22 through 27, and the definitions in Attachment 2 of DOE Order 5500.1B, *Emergency Management System*.

**EXERCISE 4.7-J** In the context of DOE's concept of operations for the Emergency Management System (EMS), describe the three major provisions of the EMS.

**EXERCISE 4.7-K** What is the primary responsibility of the head of the field element?

**Read** the DOE Emergency Management Guide *Interim Guidance on Offsite Response Interfaces*, pages 1 through 5).

**EXERCISE 4.7-L** List examples of the EM support provided by off-site or external agencies/organizations to DOE facilities.

**EXERCISE 4.7-M** List examples of the EM response support provided to off-site or external agencies/organizations by DOE facilities.



EXERCISE 4.7-N Name the typical agreements established between DOE facilities and external or off-site agencies/organizations.

EXERCISE 4.7-O With regard to emergency management, what is the purpose of the agreements established between DOE facilities and external or off-site agencies/organizations?

**Scan** DOE-STD-1070-94, *Guidelines for Evaluation of Nuclear Facility Training Programs*.

EXERCISE 4.7-P Using DOE-STD-1070-94, describe the role of the evaluator while performing assessments or evaluations of contractors.

EXERCISE 4.7-Q Using DOE-STD-1070-94, identify the essential elements of a performance-based assessment.

**Read** DOE-STD-1056-93, U.S. Department of Energy Standard, *Guide to Good Practices for Line and Training Manager Activities Related to Training*, Sections 2.7, 3.4, and 5.11, pages 6 through 8, 14 through 15, and 28 through 29.

**Read** DOE-STD-1070-94, U.S. Department of Energy Standard, *Guidelines for Evaluation of Nuclear Facility Training Programs*, Sections 5.3, 6.0, and 7.0, pages 9 through 16.

**Read** DOE-HDBK-1078-94, U.S. Department of Energy Handbook, *Training Program Handbook: A Systematic Approach to Training*, pages 53 through 63.

EXERCISE 4.7-R Review the appendix of DOE-STD-1070-94, U.S. Department of Energy Standard, *Guidelines for Evaluation of Nuclear Facility Training Programs*.

EXERCISE 4.7-S Review Attachment 48 of DOE-HDBK-1078-94, U.S. Department of Energy Handbook, *Training Program Handbook: A Systematic Approach to Training*.

**Read** U.S. Department of Energy *Emergency Operations Drill or Exercise Evaluator Manual*, pages 1 through 47.



**Read** U.S. Department of Energy *Guidance for Emergency Response Drills and Exercises*, pages 1 through 21.

- EXERCISE 4.7-T      Develop a simple matrix outlining the steps and describing the process for planning emergency response exercises.
- EXERCISE 4.7-U      What are the roles of the exercise coordinator, controllers, evaluators, players, and observers during an emergency response exercise?
- EXERCISE 4.7-V      What are the elements of a full-participation exercise package?

### 3. Summary

- a. Emergency management activities are typically categorized as planning, preparedness, and response. A fourth category is recovery from an emergency event.

Planning includes the development and preparation of emergency plans and procedures and the identification of necessary personnel and resources to provide an effective response to an emergency event.

Preparedness includes the training of personnel; acquisition and maintenance of resources; and exercising of the plans, procedures, personnel, and resources essential for emergency response.

Response represents the implementation of planning and preparedness during an emergency and involves the effective decisions, actions, and application of resources that must be accomplished to mitigate consequences and recover from an emergency.

Although reentry and recovery are often spoken of as a single item, they are two separate but related activities, each with its own purpose and implementation concerns.

The DOE Emergency Management Guide defines reentry as “a planned activity to accomplish a specific objective(s) set by the emergency response organization, conducted prior to the termination of emergency response, which involves reentering a facility or affected area that has been evacuated or closed to personnel access during the course of an emergency.”



DOE Order 5500.1B defines recovery as those actions taken after a facility has been brought to a stable or shutdown condition to return the facility to normal. The recovery phase of emergency management continues from the time an operational emergency is declared terminated until the facility and any affected areas meet predetermined criteria for the resumption of normal operation or use.

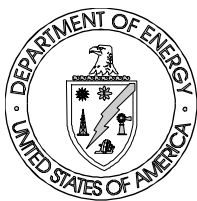
- b. The emergency plan describes the provisions for response to an operational emergency. The plan details the range of potential emergencies; emergency action levels, which trigger emergency response actions; the on-site emergency response organization; and on-site and off-site facilities and equipment available to respond to the specific potential emergencies.
- c. Proper egress from a building or structure will ensure the safety of its occupants during a fire or other emergency. Establishing this process (of proper egress) entails the development of emergency action and fire prevention plans, and requiring various safety codes and specifications for buildings and structures to contain exits, fire protection equipment/systems, and other safety features.
- d. Assessments/Evaluations

The role of the evaluator while performing assessments or evaluations of management and operating (M&O) contractors at government-owned, contractor-operated (GOCO) facilities is to assess the status of the contractor's programs or systems and to report the results, noting deficiencies when applicable.

The essential elements of a performance-based assessment include the following:

1. Planning of the assessment
2. Observations of routine operations, maintenance, special activities, drills, training, etc.
3. Interviews with personnel from the appropriate areas, such as operations, maintenance, training, radiological controls, etc.
4. Review of facility policies and procedures, logs, rounds inspection sheets, radiation control records, etc.
5. Comparison of the information gathered with the requirements in the procedures, etc., to determine where deviations appear to exist
6. Further investigation using additional observations, interviews, and document reviews to clarify these deviations from requirements and to determine if programmatic or widespread problems exist

The purpose of an assessment report is to provide documentation to support all findings and concerns identified by the assessor(s). It formally states the status of reviewed areas and acts as the reference for future discussions regarding corrective action plans, etc.



## Section 5.0

- e. The facility's training organization and programs should be evaluated periodically to determine whether they are achieving the established goals and objectives. The effectiveness of training programs to produce qualified personnel should also be evaluated periodically. This should be accomplished by reviewing operating occurrences, interviewing job incumbents and first-line supervisors, observing operations, etc. The results of these evaluations, if used correctly, will help ensure a facility of safe, efficient, and reliable operations.

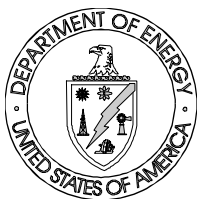
The following considerations should be emphasized when evaluating training and qualification programs:

- The responsibility for monitoring indicators, analyzing data, and approving revisions is clearly defined.
- The training department is alerted to facility operating, maintenance, and industrial safety experiences.
- Communication on training effectiveness occurs between plant supervisors and the training department.
- Employee opinions of the equality and effectiveness of training are collected periodically.
- The training department is alerted to employee performance errors.
- The training department meets with maintenance and operations supervisors and engineers to determine potential training problems.
- Training uses facility inspection and evaluation reports to guide program revisions.
- Facility modifications and procedure changes are monitored for training consequences.
- Training monitors industry operating and maintenance experiences for program impacts.
- Regulatory changes are reviewed for training consequences.
- Program performance data are analyzed.
- Proposed changes are reviewed by appropriate facility and training personnel.
- Training changes are tracked.

- f. Evaluation of a technical training and qualification program activity typically includes the following criteria:

Evaluation of a Technical Training and Qualification Program	
Criteria	Applications
Are the materials prepared at a level of skills and knowledge appropriate to the trainees?	Determine whether material content can be related to expected entry-level skills and knowledge, including appropriate reading level of the trainees.





Evaluation of a Technical Training and Qualification Program	
Criteria	Applications
Are the materials clearly written and presented so the trainee can complete the required learning activities?	Determine whether selected trainees can use the materials and complete the learning activities.
Do the materials reflect the learning objectives of the desired program?	Assess the material, comparing the learning objectives to those of the desired program, and determine which learning objectives are not covered adequately.
Are the materials consistent with other materials used in the training program or the mastery of the learning objectives?	Analyze sets of materials to determine whether they are supportive and provide an effective progression of learning.
Do the materials conform to the learning activities of the desired program?	Analyze the materials, comparing the learning activities to those of the desired program. Identify any deficiencies.
Are the materials practical for use in the given facility situation?	Determine whether the materials can be used in facilities with available equipment, time, and space, and with the number of trainees planned.

- g. Drills and exercises are key elements of DOE emergency management programs. Drills provide hands-on training for specific aspects of facility operation or emergency response. Exercises are the means by which the integrated, overall emergency response capability identified in emergency plans is demonstrated and evaluated.

An exercise is a comprehensive performance test of the integrated capability of most aspects in the site/facility emergency management program. Exercises test the adequacy and effectiveness of the following elements:

- Organizational command and control
- Implementation procedures
- Notification and communication networks
- Emergency equipment
- Response organization personnel performance
- The overall emergency response program performance



#### **4. Exercise Solutions**

**EXERCISE 4.7-A** List two activities associated with each of the following:

- Planning
- Preparedness
- Response
- Recovery

**ANSWER 4.7-A** Any two activities from the following are acceptable.

Activities associated with planning are (1) conducting a facility hazards assessment, (2) determining the facility emergency planning zones, and (3) assessing facility/site response capabilities.

Activities associated with preparedness are (1) assigning responsibilities and authorities, (2) acquiring and maintaining resources, and (3) performing drills and exercises.

Activities associated with response are, among others (1) categorization and notification, (2) consequence assessment and protective actions, and (3) public information.

Activities associated with recovery are (1) evaluation of damages, (2) development of a recovery plan, and (3) consequence assessment and environmental monitoring.

**EXERCISE 4.7-B** Describe how planning and preparedness activities can help to ensure a successful emergency response.

**ANSWER 4.7-B** Planning includes development and preparation of plans and procedures to ensure an effective emergency response. Preparedness activities ensure that plans and procedures are adequate and valid, that equipment and facilities are available for emergency response, and that personnel are trained to effectively implement the plans and procedures when responding to an emergency to protect workers, the public, and the environment.



EXERCISE 4.7-C Using DOE Order 5500.3A, name the 13 elements required for an emergency management program in DOE.

ANSWER 4.7-C The 13 elements of an emergency program include the following:

- Emergency response organization
- Off-site response interfaces
- Operational Emergency Event Classes
- Notifications
- Consequence assessment
- Protective actions
- Medical support
- Recovery and reentry
- Public information
- Emergency facilities and equipment
- Training
- Drills and exercises
- Program administration

EXERCISE 4.7-D Referring to 29 CFR 1910.38, what are the basic elements of a fire prevention plan?

- ANSWER 4.7-D
1. A list of workplace hazards, handling and storage procedures, potential ignition sources, control procedures, and available fire protection equipment
  2. Names of the persons responsible for maintenance of the fire protection equipment
  3. Names of the persons responsible for control of fuel source hazards

EXERCISE 4.7-E Using 29 CFR 1910.164, what is the maximum response delay time permitted in fire detection equipment?

ANSWER 4.7-E The maximum time is 30 seconds, unless such delay is necessary for the immediate safety of employees.

EXERCISE 4.7-F Using 29 CFR 1910.165, how often must nonsupervised employee alarm systems and supervised employee alarm systems be tested for adequacy and reliability?



## Section 5.0

---

- ANSWER 4.7-F      Nonsupervised employee alarm systems - Every two months.  
Supervised employee alarm systems - Annually.
- EXERCISE 4.7-G      Compare your facilities' capabilities to the requirements for fire brigades and stations in 29 CFR 1910 and National Fire Protection Association (NFPA) 13E, 1201, and 1202.
- ANSWER 4.7-G      The answer is facility-specific.
- EXERCISE 4.7-H      According to 29 CFR 1910.156, how often are you required to inspect fire-fighting equipment, and how often to inspect portable fire extinguishers and respirators?
- ANSWER 4.7-H      Annually for fire-fighting equipment  
Monthly for portable fire extinguishers and respirators.
- EXERCISE 4.7-I      According to 29 CFR 1910.156, how often is training provided to the fire brigade?
- ANSWER 4.7-I      Annually to all, in addition to quarterly for those fire fighters who are expected to fight interior structural fires.
- EXERCISE 4.7-J      In the context of DOE's concept of operations for the EMS, describe the three major provisions of the EMS.
- ANSWER 4.7-J
  1. The development, coordination, etc., of emergency plans and procedures
  2. Ensuring the readiness of all DOE capabilities in responding to operational, energy, and continuity of government (COG) emergencies
  3. The management, coordination, and direction of responses to emergencies
- EXERCISE 4.7-K      What is the primary responsibility of the head of the field element?
- ANSWER 4.7-K      To establish and maintain an effective, integrated emergency preparedness program.



## Section 5.0

---

- EXERCISE 4.7-L List examples of the EM support services provided by off-site or external agencies/organizations to DOE facilities.
- ANSWER 4.7-L Hospitals, fire departments, ambulances, and coroners.
- EXERCISE 4.7-M List examples of the EM response support provided to off-site or external agencies/organizations by DOE facilities.
- ANSWER 4.7-M Radiological incident assistance, monitoring, detection, and assessment; medical support and advice to hospitals treating radiologically contaminated persons
- EXERCISE 4.7-N Name the typical agreements established between DOE facilities and external or off-site agencies/organizations.
- ANSWER 4.7-N Mutual aid, memoranda of understanding, memoranda of agreement, agreements in principle, state oversight agreements.
- EXERCISE 4.7-O What is the purpose of the agreements established between DOE facilities and external or off-site agencies/organizations.
- ANSWER 4.7-O
1. Provide prearranged support of alternative resources
  2. Expedite emergency operations, maximize response and recovery efforts, and simplify liability and reimbursement issues
  3. Acquire or arrange emergency services through providers, vendors, etc.
- EXERCISE 4.7-P Using DOE-STD-1070-94, describe the role of the evaluator while performing assessments or evaluations of contractors.
- ANSWER 4.7-P Generally speaking, the evaluator is responsible for assessing the status of the contractor's programs or systems and reporting the results, noting deficiencies when applicable.



EXERCISE 4.7-Q Using DOE-STD-1070-94, identify the essential elements of a performance-based assessment.

ANSWER 4.7-Q The essential elements of a performance-based assessment include the following:

- Planning of the assessment
- Observations of routine operations, maintenance, special activities, drills, training, etc.
- Interviews with personnel from the appropriate areas, such as operations, maintenance, training, radiological controls, etc.
- Review of facility policies and procedures, logs, rounds inspection sheets, radiation control records, etc.
- Comparison of the information gathered with the requirements in the procedures, etc. to determine where deviations appear to exist
- Further investigation using additional observations, interviews, and document reviews to clarify these deviations from requirements and to determine if programmatic or widespread problems exist

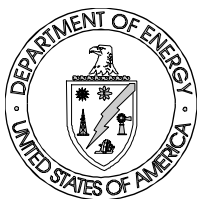
EXERCISE 4.7-R Review the appendix of DOE-STD-1070-94, U.S. Department of Energy Standard, *Guidelines for Evaluation of Nuclear Facility Training Programs*.

ANSWER 4.7-R None required.

EXERCISE 4.7-S Review Attachment 48 of DOE-HDBK-1078-94, U.S. Department of Energy Handbook, *Training Program Handbook: A Systematic Approach to Training*.

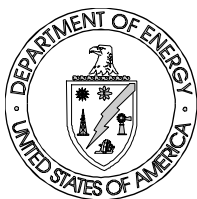
ANSWER 4.7-S None required.

EXERCISE 4.7-T Develop a simple matrix outlining the steps and describing the process for planning emergency response exercises.



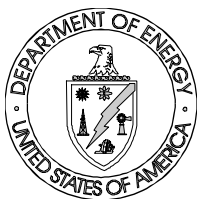
ANSWER 4.7-T      The following table offers an overall planning process:

The Planning Process for Emergency Response Exercises	
Step	Description
Develop and annually update an ERAP to cover a five-fiscal-year period in accordance with DOE Order 5500.10.	<p>Five-year (long-range) planning includes the following:</p> <ul style="list-style-type: none"><li>• General schedule, scope, and objectives of drills and exercises over the multiyear period</li><li>• Provisions for demonstrating all aspects of the emergency program in a logical manner</li><li>• Provisions for drills with sufficient scope and frequency to ensure the training and maintenance of proficiency of emergency response personnel</li></ul> <p>Fiscal-year (short-range) planning includes the following:</p> <ul style="list-style-type: none"><li>• Scope, specific objectives, identification of participants, and a schedule of the major tasks and activities associated with the current year's exercises and drills</li><li>• Confirmation or modification of the planned scope, development of detailed objectives, commitment of participants and resources, and identification and scheduling of the various activities</li></ul>
Determine the scope, objectives, and participants of the exercise.	<ul style="list-style-type: none"><li>• Identify specific predetermined objectives associated with the testing of all elements of the emergency management program.</li><li>• Participants consist of players, controllers, evaluators, and observers.</li></ul>
Establish safety and scenario development guidelines.	The safety of personnel and the facility is paramount during exercises. All participants must comply with standard safety rules and practices.
Identify budget requirements.	Resources are committed in the fiscal-year (short-term) plan.



The Planning Process for Emergency Response Exercises	
Step	Description
Develop and review a scenario.	Development of an exercise is an iterative process involving several steps. The initial step is development of general scenario guidelines by the exercise planning group as part of the planning process. These guidelines should address issues of exercise scope and duration, participants, objectives, administrative and logistic considerations, and operational or technical constraints. The next step is development of a scenario outline by the exercise coordinator and several of the more experienced members of the scenario development group. The outline should be a sequential listing of the key operational, technical, and logistic events comprising the scenario and the approximate timing of these events. Subsequent steps involve refinement of the time line of key events, development of the detailed scenario information, and preparation of the injects or specific exercise messages and data.
Arrange logistics support and organize/schedule administrative activities.	The planning and management of exercises should include provisions for adequate logistics support, with specific attention directed toward arrangements for transportation, food, shelter, medical care, and equipment and materials that are not readily available.





EXERCISE 4.7-U      What are the roles of the exercise coordinator, controllers, evaluators, players, and observers during an emergency response exercise?

ANSWER 4.7-U

Roles During an Emergency Response Exercise	
Position	Description
Exercise Coordinator	Responsible for safe conduct, coordination, continuity, evaluation, and critique of the drill or exercise.
Controllers	<ul style="list-style-type: none"><li>• Facilitate the conduct of the exercise by providing scenario information to players</li><li>• Allow freedom of player decisions</li><li>• Preclude player decisions and control actions that may compromise the safety or security of the facility, personnel, or equipment</li></ul>
Evaluators	Observe, evaluate, and document the performance of the players and the activities within their areas of responsibility.
Players	Respond during the drill or exercise in accordance with operational procedures and/or emergency plan implementing procedures as if the exercise information is real.
Observers	Appear to be nonparticipants to the players. Observers should not contribute information or opinions to players in any fashion.

EXERCISE 4.7-V      What are the elements of a full-participation exercise package?

ANSWER 4.7-V      The exercise package should include the following information:

- Scope and purpose
- Specific objectives to be demonstrated
- Participants: players, controllers, evaluators, and observers
- Safety and security information, including criteria for exercise termination



## *Section 5.0*

---

- Administrative and logistics information, such as a schedule of activities, a method for identification of the participants, identification of organizations and activities to be simulated, provisions for telephone/radio communication among controllers, and special arrangements for food and transportation
- Rules of conduct for players and observers
- Detailed instructions for controllers and evaluators
- Evaluation criteria
- Narrative summary of the scenario events (to include initial facility condition and assumptions used to develop the scenario data)
- Time line of key scenario events and anticipated response actions
- An MSEL of scenario messages for dissemination to the players and corresponding time-specific information for the controllers/evaluators
- Maps, diagrams, schematics, and/or data tables that provide scenario information additional to the messages
- Glossary of acronyms